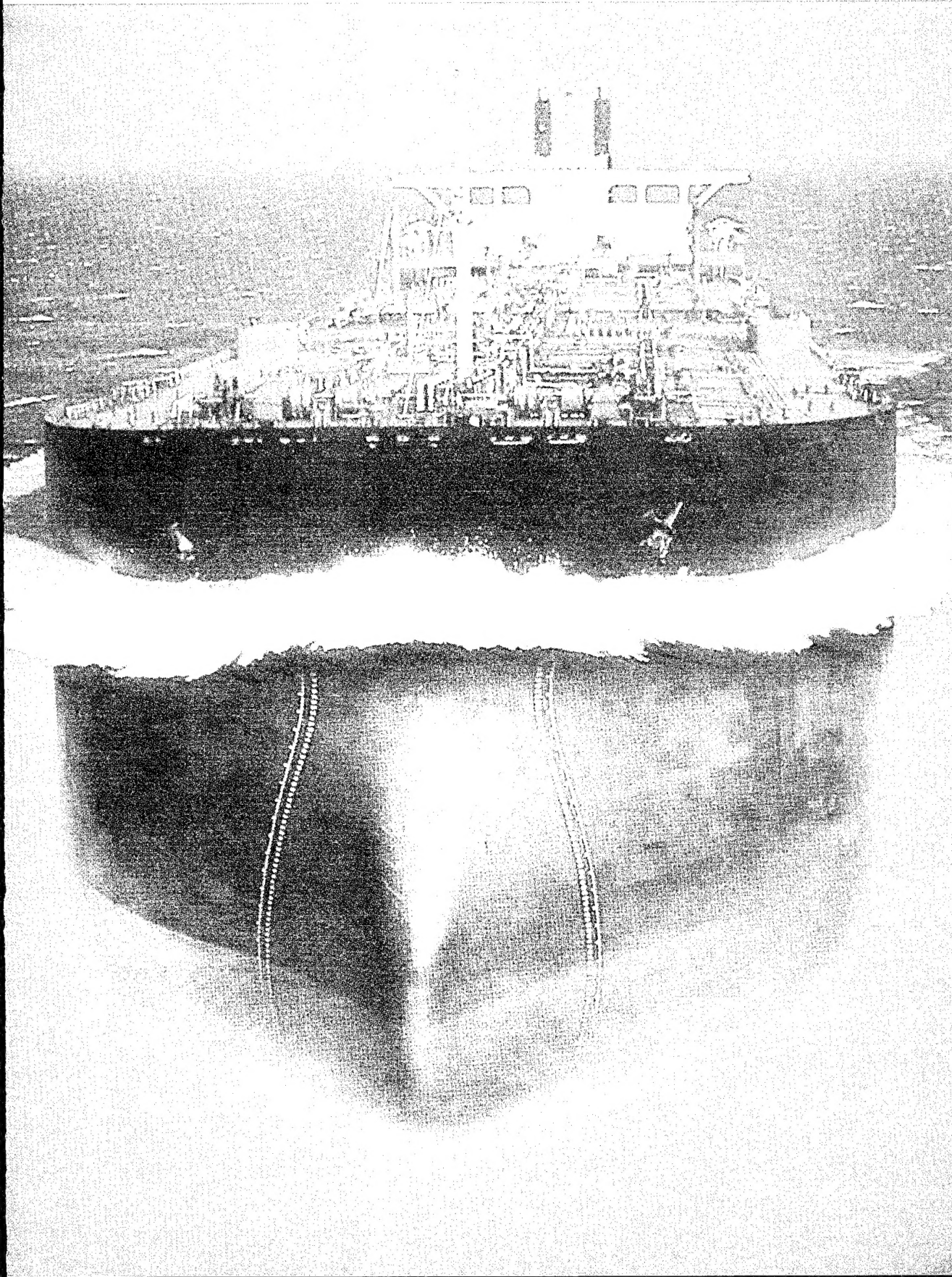


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HYDROGRAPHIC SERVICE ANNUAL REPORT 1993 - 1994





HYDROGRAPHIC SERVICE

Royal Australian Navy

ANNUAL REPORT 1993 - 1994

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Hydrographer's Foreword

Commodore Leech was appointed head of the RAN Hydrographic Service in November 1990. A career naval officer, he has completed 25 years of naval service, ten of those in the United Kingdom. Recent senior appointments have included Director Hydrographic Office, Deputy Director Hydrographic Development and Commanding Officer HMAS MORESBY.

It is a pleasure to present the 30th Annual Report of the Royal Australian Navy's Hydrographic Service. The report describes the activities and achievements of the Service for the period 1 July 1993 to 30 June 1994, and is the latest in a series recording the surveying and charting of the Australian coast, and national and international trends in hydrography.

There have been a number of initiatives in the international arena which have raised the profile of all hydrographic services. Through its Agenda 21, UNCED has emphasised the importance of nautical charting in protection of the marine environment. The International Maritime Organisation (IMO), through both its Marine Environment Protection Committee and its Maritime Safety Committee, has stressed the importance of expediting the availability of Electronic Chart Systems. The IMO has progressed the adoption of Standards for Electronic Chart Display and Information Systems (ECDIS), and is expected in 1995 to endorse ECDIS as the legal equivalent of the paper chart under international carriage requirements. IMO is also revising Chapter 5 of the SOLAS regulations, and is expected to include provision of hydrographic services as a Responsibility of Government.

These international policy developments are now being reflected in the activities of Government, as bodies responsible for maritime safety and environment protection strive to put in place measures for the effective prevention of marine pollution.

The continuing focus for senior management during the year has been the transition to digital products and services. In 1992/93 the emphasis was on proving data structures and standards, successfully achieved through an afloat test bed. In 1993/94 the emphasis has been on developing the office organisation and infrastructure to support digital charting services, with good progress being made. Efforts to obtain funding for this transition have continued during the year.

The requirement for digital hydrographic data to support Defence Force operations has also been recognised during the year as a matter of increasing importance.

The provision of traditional charting and navigation services has continued and is detailed in the body of this report. It remains a concern that 30% of the chart series is in need of major recompilation, and that some important services such as Sailing Directions have not yet been repatriated from the UK. Efforts continue to obtain resources to make good these shortcomings. The new hydrographic office in Wollongong was started during the year, and will be occupied in November 1994.

Hydrographic survey work has continued in a number of economically important areas in the north of Australia. An outstanding feature has been the excellent performance of the Laser Airborne Depth Sounder (LADS) Unit in its first year of operation.

In closing I would like to pay particular tribute to our staff both ashore and afloat. Office staff turnover has been particularly high in the lead up to relocation to Wollongong, and many long serving and very experienced people have left. Our uniformed staff have also worked extremely hard to achieve a high rate of effort at sea. Their combined efforts are of vital importance to sustaining Australia's economic development and promoting safety at sea. I would like to say "Well Done!" to all concerned.

A handwritten signature in dark ink, appearing to be 'J.W. Leech'.

J.W. Leech
Commodore, RAN

Corporate Overview

Background. The RAN Hydrographic Service is the Commonwealth Government Agency responsible for the publication of nautical charts and other information required for the safety of ships navigating in Australian waters.

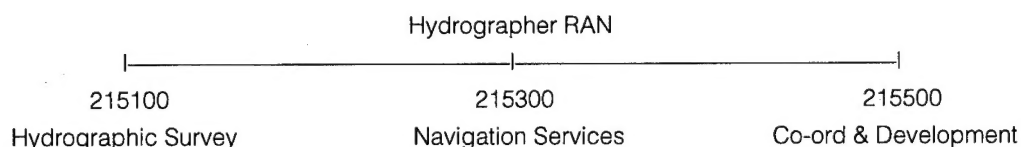
The Hydrographic Service has its origins in the British Admiralty Hydrographic Office, which was established in 1795. The Admiralty carried out surveys and published charts of the Australian coast throughout the 19th century in support of the defence and commercial development of the colonies. The RAN assumed responsibility for hydrographic surveys in 1920, and for publication of charts in 1942. In 1946 the Federal Cabinet made the Commonwealth Naval Board responsible for the surveying and charting of Australian waters. This responsibility was confirmed in 1988 after a review of Commonwealth mapping activities.

Mission. The Hydrographic Service supports the Australian Defence Force, the Federal Government and the international maritime community as a national centre of excellence for all hydrographic services necessary for maritime operations and safe navigation in the Australian area of charting responsibility.

Corporate Objectives

- ❖ To meet the Australian Defence Force (ADF) requirement for hydrographic services so that maritime forces may be deployed and operated to the optimum during peacetime and at war.
- ❖ As a community service, to discharge Government's responsibility to provide hydrographic and navigational services to support safe navigation of all vessels in the Australian area of charting responsibility, to meet the requirements of domestic and international law, to support maritime administration and economic development, and for protection of the marine environment.
- ❖ To act as custodian of the national data bases of hydrographic information.
- ❖ To advise the Federal Government and international maritime organisations on national and international hydrographic issues.
- ❖ As an ADF spatial data agency, to provide hydrographic support to operational capabilities in accordance with strategic priorities.
- ❖ To achieve continuous improvement of service delivery as a professional organisation which seeks excellence and values the contributions of its members.

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	CRA&I	<input type="checkbox"/>
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	TAB	<input type="checkbox"/>
Unannounced		<i>per RTR</i>
Justification		
By		
Distribution /		
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Avail and / or		
Special		
Dist	A-1	

Manager: Hydrographer RAN

Captain Willis joined the RAN in 1967 and undertook specialist training in hydrographic surveying in 1975. He holds the degrees of Bachelor of Surveying with First Class Honours and Master of Management Economics from UNSW, and is a graduate of the RAN Staff College. He has commanded the landing ship HMAS SALAMAU and the surveying ships HMAS FLINDERS AND MORESBY. He assumed the duties of Director Hydrographic Operations on promotion to Captain in November 1990. He was posted to Navy Office as the Director of Naval Programs in April 1994, and has been relieved by CAPT Geoff Geraghty, RAN.

Hydrographic Operations And Survey

The RAN surveying and charting plan, HYDROSCHEME, is developed through consultation with the Department of Defence and various international and national maritime authorities. The HYDROSCHEME is currently revised annually and promulgates proposed survey areas for the immediate future. The Operations element of the Hydrographic Office directs and co-ordinates hydrographic units on respective HYDROSCHEME tasks. For the period 1993/94 the achievement of surveys against HYDROSCHEME is outlined at Annex B and depicted at Figure 1 in the Annexes section.

HMAS MORESBY. The ship returned to Fleet Base West (FBW) in July 1993 after undertaking an Oceanographic Cruise in north Australian waters. The ship's first two replacement Survey Motor Boats (SMB) conducted a detached survey during this task. These vessels showed a considerable improvement to the previous class of SMBs, in terms of performance, comfort and efficiency.

MORESBY deployed to northern Australia again in September 1993 to conduct a survey in Arnhem Land. This tasking was to be MORESBY's last survey using ARGO as the primary position fixing system. Differential GPS was installed during the course of this season. The ship then conducted surveys off the South Australian coast, in the Spencer Gulf and off Cape Northumberland in the western approaches to Bass Strait. MORESBY also participated in the 27th FIG Conference at the World Trade Centre in Melbourne. MORESBY celebrated 30 years in commission on 6 March 1994.

HMAS FLINDERS. The ship completed a major refit in July and sailed for her next survey season in Arnhem Land. In October, the ship returned briefly to Cairns before making passage to Norfolk Island. This was FLINDERS' first visit to the region and also represented the Hydrographic Service's first dedicated survey of the isolated island.

The ship was awarded the LCH and Marine Science Force Proficiency Shield in December 1993. Survey operations between January and June 1994 centred on the Gulf of Papua, PNG and Endeavour Strait. FLINDERS celebrated 21 years in commission on 27 April 1994.

HMA Ships MERMAID and PALUMA. At the beginning of the period both ships were conducting a survey off Townsville which aimed at determining the feasibility of a shipping route from the Abbot Point Coal Facility to the Coral Sea, through Flinders Passage. This work was successfully undertaken in conjunction with the LADS unit. Work in the vicinity of Princess Charlotte Bay was undertaken in the following season which aimed at identifying a suitable alternative route for shipping between Portland Roads and Pison Island.

The survey of Endeavour Strait was conducted to confirm existing leadline data and to identify a possible alternative shipping route to the existing Prince of Wales Channel. At the end of the year MERMAID and PALUMA were on task in the Gulf of Carpentaria, surveying the approaches to an anchorage in the vicinity of the Sir Edward Pellew island group, in support of a planned mineral exportation program from the McArthur River Mining Project.

HMA Ships SHEPPARTON and BENALLA. Following an extended maintenance period both ships commenced work in the Great North East Channel in September 1993. The beginning of 1994 saw the ships surveying in the Capricorn Group, in conjunction with the LADS unit. Adverse weather and sea conditions for the duration of the season hampered survey progress and much of the area was subsequently sounded by LADS. An alternative survey task was programmed in the coastal waters between Great Keppel Island and Rosslyn Bay.

A further season in Torres Strait followed in May which tasked the ships to confirm the feasibility of a shipping route through Cumberland and Hibernia Passages out to the Murray Island group. This work will eventually connect the Great North East Channel to Flinders Entrance and the Coral Sea. SHEPPARTON suffered damage to the hull, propellers and underwater fittings during this survey as a result of grounding on an uncharted reef.

Laser Airborne Depth Sounder (LADS) Unit. The Laser Airborne Depth Sounder (LADS) Unit was accepted into Naval Service in Cairns on 8 October 1993 and completed its first operational survey in the vicinity of Flinders Passage, off Townsville, the following month. During this survey 80 million soundings were gathered in a 10 metre grid over an area of some 2,291 nm². In November, sounding commenced off the Queensland coast, in Princess Charlotte Bay, to investigate an alternative shipping route inside the Barrier Reef.

At the beginning of 1994, LADS deployed to Rockhampton for three months whilst undertaking a survey in the Capricorn Group. Water clarity was excellent and LADS routinely obtained depths to 50 metres. Cairns based for the remainder of the year, LADS commenced surveys in the Torres Strait with routine overnight stops in Weipa. The unit deployed to Jakarta for two weeks in June, to enable the laser system to be demonstrated to the Indonesian Government.

Hydrographic Office Detached Survey Unit (HODSU). HODSU completed Operation Beachcomber 93 in July and returned to Sydney the same month. A number of large scale wharf surveys were conducted at Garden Island (Fleet Base East) during August and September, before efforts were directed toward preparations for the forthcoming Antarctic season at Macquarie Island in November, embarked in MV ICEBIRD.

The unit returned to Sydney towards the end of the year and conducted a benchmark survey in Indonesia in February of this year, as part of the marketing exercise for LADS. Reconnaissance for Beachcomber 94 was undertaken in May before deploying for the exercise in mid June.

Tidal Section

The Section's work this year included production of the Australian National Tide Tables as well as the Solomon Islands and Vanuatu National Tide Tables. Support was also provided for cartographic tasks and hydrographic unit operations. In addition to the traditional printed tide tables, the prototype of a digital Electronic Tide Tables (ETT) has been developed and has now been distributed in preparation for a more comprehensive commercial version in 1995.

Work has also progressed on the Australian Tidal Manual. The glossary, which has already been assembled, will be supplied to the RN Hydrographic Office for inclusion in the new Admiralty Tidal Manual.

RAN Hydrographic School

The Hydrographic School has conducted a total of four major courses. In addition the school has conducted a number of short specialised courses for Mine Warfare, Navigation and Mine Clearance Diving Officers. A total of 28 students, including 5 overseas personnel, have attended major courses.

The School has seen some significant changes in equipment over the past year, including the delivery of two new Survey Motor Boats. In addition new Ashtec Differential GPS receivers were introduced into the Hydrographic Service in April of this year.

In October last year the school provided a venue for the SW Pacific Hydrographic Commission Conference, which saw representatives attending from six nations which included the USA and the UK.

Assessment Against Performance Indicators

The total area surveyed by the Hydrographic Service during 1993-94 was 45,295 nm (7,170 nm²). This figure is a vast improvement from previous years due to the formal introduction into Naval Service of the LADS unit in October 1993.

Unit	Days at sea as a % of Days away from base port	Miles sounded as a % of miles steamed
MORESBY	85 %	38 %
FLINDERS	87 %	51 %
MERMAID	94 %	23 %
PALUMA	90 %	25 %
SHEPPARTON	87 %	18 %
BENALLA	88 %	12 %
HODSU	54 %	N/A
Average	81 %	33 %

2. Navigation Services

Manager: Director Hydrographic Operations

Role

The provision of marine navigation information, and the delivery of customer services and products related to safety of navigation at sea.

Elements

Nautical Charting.
Navigational Services.
Information Services.
Chart Distribution.

Objectives

To provide timely delivery of services and products to the Australian Defence Force (ADF) and maritime community.

Performance Indicators

The extent to which products and services are supplied to satisfy the ADF and maritime community's navigation needs.

To produce sufficient products and services to a standard that will meet Australia's needs for safe navigation in Australian and Papua New Guinea waters.

The extent to which products and services cover the navigable waters around Australia and Papua New Guinea, in a timely and accurate manner.

Nautical Charting

The Nautical Charting Element maintained steady progress in meeting its responsibilities in relation to new chart production, revision of existing published charts and updating of the master reproduction medium of published products. Digital workstations associated with the Autochart 'A' series platform have been increased in number to accommodate further trained operating staff.

The nautical chart digital data base continued to increase in volume and content. This comprehensive data base of navigational information is an essential repository for the development of derivative charting products, and services the overall hydrographic data base as an integral component. There are now 165 chart files contained within this process with a further 17 charts, in various digital production stages, progressively being included.

Chart revision and continuous reprinting has once again involved considerable use of staff resources in an endeavour to maintain an equitable flow of updated products for public use. 261 charts were involved in the FY 1993/94 reprinting program, with 178 needing revision. The much needed refurbishment of deteriorating chart reformat, arising from recurring reproduction processing, has been effected by developing digital chart files of published chart information.

Management of information relative to published and planned paper charts, stock replenishment and details of notices to mariners, continue to be monitored through the Chart Information System (CIS). Composition of the data base has been advanced significantly to include a broader range of paper chart intrinsic details. Utilising the CIS system a chart catalogue is being developed to replace a published chart index of two parts.

The chart production section was restructured in October 1993 under the terms of 'Project Charting', which specifically aimed at developing individual leadership skills, greater communication and improved worker satisfaction in the chart production process.

Navigational Services

Maintaining up-to-date charts continued via the weekly issue of Notices to Mariners (see Annex D). The Element also responded to queries from authorities and the public on a range of issues from place names and maritime features, to general depth data. Progress towards a national set of Sailing Directions continued, with draft copies of the first of 17 volumes in use by minor fleet units operating in the Coral Sea.

Information Services

This was a year of consolidation by the Hydrographic Office Library. The changes implemented created a much more user friendly environment and this was supported by a 5% growth in loans. The Records section received some 927 items of hydrographic information from RAN Units and other sources (see Annex E). This incoming data affected 89 charts.

A new plan storage system (Multiplan) has been introduced as part of the relocation to Wollongong. This transition and cataloguing commenced in February. It involves conversion to the new hanging system and entry into a computer data base of some 60,000 documents.

Chart Distribution

For the first time in many years an exhibit of the functions of the Hydrographic Service was undertaken at the Sydney Boat Show during July/August 1993. Specially designed displays on survey methods, production techniques and new technologies were exhibited. It is intended that participation in the Boat Show will become an annual commitment with the possibility of expanding the participation to include Melbourne, Brisbane and Perth in years to come.

A chart display of the course of the Sydney to Hobart Yacht Race was supplied to the Cruising Yacht Club of Australia (Darling Point, Sydney) to assist their efforts in organising the 1993 race.

The following chart agents were appointed during FY 1993/94:

Argosy Norfolk, Norfolk Island;

Boat Books Ltd, Auckland, New Zealand;

Boat Books Ltd, Whangarei, New Zealand;

Chart and Map Shop, Fremantle, WA; and

Seasafe Marine Supply Co., Taipei, Taiwan.

Assessment Against Performance Indicators

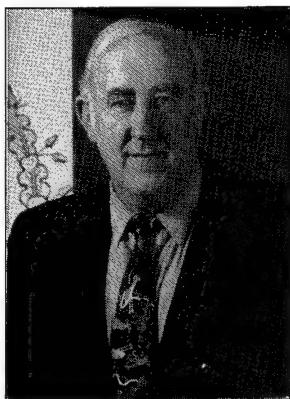
Thirteen new charts and ten new editions were produced during the FY. The ADF was supported with the production of eleven charts and a number of miscellaneous graphics.

The inter-Services arrangement and program for chart printing was maintained with a slight increase in the number of charts reprinted during the period. 261 charts were involved, of which 178 required revision and 83 went unrevised (direct reprinting for restocking purposes).

Overprinting of corrections to Australian chart stock before issue has been achieved through screen printing procedures to ensure that users are supplied with up-to-date products.

The Nautical Charting Element has maintained support to Navigational Services through the preparation of 23 block chartlets issued in weekly Notices to Mariners. Cartographically prepared overlays for screen printing purposes has been an on-going commitment during the year.

640 Notices to Mariners were issued over the period.



3. Co-ordination And Development

Manager: Director Co-ordination and Development

Ken Burrows first joined the Hydrographic Office as a cartographer in the late 1950s. He compiled many of the more complex charts around Australia and was responsible for introducing computers into hydrography in the mid 1970s. He was also largely responsible for the successful concept implemented as AUTOCHART, the chart production system still in use today. His ideas on hydrographic information, and initiatives for progressing the development of an electronic chart display and information system, have resulted in Australia being a world leader in the development of electronic charting. In 1993 Ken Burrows was awarded an O.A.M. for his services to marine cartography.

Role

Component wide aspects of planning, resourcing and co-ordination of hydrographic, surveying and cartographic operations and information management. Servicing and promoting the national activities of the Component.

Elements

Hydrographic Development.
Branch Development.
Corporate Services.
National and International Affairs.

Objectives

Supply the long-term planning and co-ordination of resources for tasks necessary to meet strategic guidance and national responsibilities.

Promote the Hydrographer's national and international role in hydrography.

Provide development and investigation services to meet specific program requirements with minimum disruption to operational areas.

Performance Indicators

The number of development initiatives successfully implemented.

The ability to meet international commitments affecting the national role of providing maritime geographic and hydrographic information.

The degree to which essential planning and project tasks can be performed without impinging on resources available to the operating areas.

The ability to provide management information on resource utilisation and control.

Hydrographic Development

Hydrographic Development activities for the period focussed primarily on uniformed manpower, ship and system resources, and operating standards and procedures required to support the through life management of hydrographic data.

In January 1994 the Force Structure Policy and Programming Committee (FSPPC) approved Project SEA 1401 - New Hydrographic Ships. These two new ships will replace HMA Ships MORESBY and FLINDERS and will enter Service in 1997 and 1998 respectively.

Development of a multi-crewing philosophy was commenced for these new ships, and may be trialed in the near future. Other category specific initiatives were also undertaken within the broader Navy context of continuing to improve conditions of service. A recently commissioned Hydrographic Service manpower study promises to provide the necessary focus for future manpower directions.

The recent award of three Document Development Contracts for the new hydrographic ships has led to an increase in demand for hydrographic specialist/user input over the period. Primary areas of interest in this project included the provision of a Hydrographic Survey System (HSS), which will provide the RAN with the most advanced integrated hydrographic survey and electronic chart system in the world. Other system



Mr Dan Pillich - Tidal Officer

20-22 Jun 94 IHO Working Group meeting on Release of Tidal Data to Commercial Organisations,

Cape Town, Republic of South Africa

The Hydrographer, RAN hosted the Inaugural Meeting of the South West Pacific Hydrographic Commission (SWPHC) in Sydney, Australia on 19-20 October 1993. Representatives from all Member States of SWPHC, the IHB and South Pacific Applied Geoscience Commission (SOPAC) attended the meeting.

Progress on the issue of national accreditation of hydrographic surveyors culminated in the establishment of a Hydrographic Commission within the Institution of Surveyors, Australia in March 1994, and the election of a National Hydrographic Surveyors Board in June 1994. The Board, chaired by the Hydrographer, will accredit hydrographic surveyors on a national basis on FIG/IHO Standards, as well as manage the operation of the Commission.

Assessment Against Performance Indicators

The major development tasks of ECDIS and transition toward the implementation of an Australian Hydrographic Data Centre dominated the year's efforts, with significant progress being made towards their eventual implementation.

All international commitments affecting the national role of providing marine geographic and hydrographic information were met during the period.

Planning and project tasks impacted minimally on operational areas, except where transition to a digital charting regime was considered.

Management information was provided satisfactorily in accordance with component objectives for resource management.

National and international policy developments in the areas of maritime safety and protection of the marine environment have continued to support the work of hydrographic programs. Further details on the Hydrographer's paper to SPILLCON '94 and related documents are available on request from the Hydrographic Office.

Statement of Income and Expenditure

Expenditure		\$M
Executive		0.186
Hydrographic Survey		
Operations and Surveying ¹	8.985	
MSF Vessels ²	28.378	37.363
Navigation Services		5.629
Co-ordination and Development		5.773
Total:		48.951 ³

Income

Net Sales Revenue		1.456
Department of Defence Appropriation		47.495
Total:		48.951

Notes:

1. Includes LADS Unit costs.
2. Includes full vessel operating and crew salary costs funded outside Component 215000.
3. Includes all civilian and Service salary expenses for Component 215000. Total approximate.

Chart Revenue**Distribution of Charts & Associated Publications**

		1991-92	1992-93	1993-94
Australian.	Issued	29,075	25,739	25,350
	Sold	95,921	113,275	103,845
British Admiralty	Issued	16,144	12,554	10,852
	Sold	5,327	5,332	5,262
New Zealand	Issued	1,627	1,748	1,451
	Sold	238	407	426
Canadian	Issued	26	43	7
	Sold	69	54	19
Total:		148,427	159,152	147,212

Value of Charts & Associated Publications Sold

(Exclusive of Sales Tax)

	1991-92	1992-93	1993-94
Australian	\$947,075	\$1,255,705	\$1,317,808
British Admiralty	\$116,857	\$130,070	\$132,088
New Zealand	\$3,174	\$5,490	\$6,291
Canadian	\$455	\$356	\$125
Total:	\$1,067,561	\$1,391,621	\$1,456,312

Revenue Summary

	1991-92	1992-93	1993-94
Net Sales	\$1,067,561	\$1,391,621	\$1,456,312
Sales Tax	\$69,189	\$81,283	\$89,555
Freight & Sundries	\$43	\$118	\$262
Total:	\$1,136,793	\$1,473,022	\$1,546,129
Value of Issued Stock	\$741,110	\$665,097	\$635,281

Note. An average of 30,000 AUS series charts are also issued/sold by the UK Hydrographic Office annually.

Surveys Undertaken (July 1993 - June 1994)

Unit(s)	Instruction	Location	Area Sounded (nm²)
HMA Ships MERMAID and PALUMA	HI 186	Flinders Passage, QLD	159
	HI 192	Bunker Reef to Fairway Channel, QLD	143
	HI 194	Endeavour Strait, QLD	174
HMA Ships SHEPPARTON and BENALLA	HI 184	Stephens Islet to Zuizin Island, Torres Strait	372
	HI 198	Capricorn Group, QLD	28
	HI 207	Torres Strait, QLD	45
HMAS FLINDERS	HI 190	Norfolk Island, Coral Sea	161
	HI 197	Gulf of Papua, Torres Strait/PNG	652
	HI 209	Endeavour Strait, QLD	81
HMAS MORESBY	HI 196	Spencer Gulf, SA	221
	Oceanographic	NT	1550
	Cruise 1/93		
HMA Ships MORESBY and FLINDERS	HI 195	Elcho Island to Yabooma Island, Arnhem Land, NT	1255
LADS Unit	HI 185	Flinders Passage, QLD	1550
	HI 193	Bunker Reef to Fairway Channel, QLD	300
	HI 199	Capricorn Group, QLD	413
	HI 206	Torres Strait, QLD/PNG	54
HODSU	HI 176	Macquarie Island, Antarctica	12

Total:**7170**

Chart Production And Maintenance

	1991-92	1992-93	1993-94
New Chart Production			
New charts published	13	6	13
New editions published	21	11	10
New charts/diagrams for RAN use	8	9	11
Miscellaneous charts	1	1	5
Chart Maintenance			
Modified reproductions of BA charts	30	4	0
Notice to Mariners block corrections	25	22	23
Revisions by reprinting	175	147	178
Revisions by screen printing	212	110	83
Miscellaneous graphics	26	41	9

New Charts Published

The information shown on all new charts is contained in the Hydrographic chart digital data base.

Aus 449 Magnet Bay to Cape Rouse, 1:500 000

A route planning chart to Australia's Antarctic base, Mawson. This chart indicates ocean depths of a reconnaissance nature derived from a number of cruise recordings, and covers an area 140 miles seaward of Kemp and MacRobertson Lands, Antarctica. It is the third chart in the series of twelve at this scale covering the AAT.

Aus 743 Barrow Island to Onslow (Western Australia), 1:150 000

This coastal navigation chart replaces former chart Aus 743 published in 1970. Limits have been reschemed and calculated to a common mid latitude for this scale series so that adjoining chart scales are compatible. Modern vertical and horizontal datums have been applied.

Aus 747 Shark Bay, Northern Sheet (Western Australia), 1:150 000

This coastal navigation chart is the second published of three charts covering the Shark Bay region. Modern datums have been applied, vertical Lowest Astronomical Tide and horizontal World Geodetic System 84. Although the bulk of the ocean depths recorded are of a reconnaissance nature from old and inadequate surveys, modern surveys 1970 to 1985 are included in specific areas of the chart. Included is a plan of Carnarvon 1:37 500.

Aus 614 Diamond Passage (Coral Sea), 1:150 000

Designed to indicate the extent of Lihou Reef and the waters surrounding Diamond Islets. The chart shows deep water access through Diamond Passage transited by shipping conveying coal from Mackay through Hydrographers Passage and northward through the waters of this chart enroute to Japan. The chart is based on modern vertical and horizontal datums depicting soundings derived from RAN surveys 1985-89.

Aus 151 Western Port, Entrance and North Arm (Victoria), 1:37 500

Former Aus 156 published 1972 has been withdrawn and reschemed with a new number, Aus 151. The new chart based on modern vertical and horizontal datums includes an inset plan showing a continuation of the main chart's north eastern limit from Eagle Rock to Boulton Channel. The chart is inclusive of Port of Melbourne authority surveys to 1993 and RAN surveys to 1990.

**Aus 4621 Mackay to Port Moresby, 1:1 500 000
(Int 621)**

An International chart whose limits fall within the International Hydrographic Organisation's scheme, Area 'L', in the SW Pacific Ocean. This chart replaces Aus 427 and Aus 429 both at scale 1:1M, produced in 1970 and 1960 respectively by the British Admiralty.

Aus 748 Shark Bay, South-Eastern Sheet (Western Australia), 1:150 000

This coastal navigation chart completes the three chart scheme for the Shark Bay region. Based on modern vertical and horizontal datums the chart contains a mixture of recent adequately controlled surveys 1985-88 and old, less adequate surveys of 1858 where depths are shown in upright style.

Aus 809 Port Jackson to Port Stephens (NSW), 1:150 000

This metric coastal navigation chart based on modern vertical and horizontal datums replaces the former chart Aus 809 published in 1960 in imperial units. Apart from the inclusion of a number of small coastal area surveys of recent times there has been no major offshore hydrographic survey conducted within the charts limits. In keeping with modern survey standards, older surveys determined as reconnaissance or inadequate are shown by upright style soundings.

Aus 14 Milner Bay to Cape Shield (Northern Territory), 1:75 000

This new large scale metric chart replaces former published metric chart Aus 14 of 1970. Limits have been reschemed to provide greater seaward coverage of the northern approach from Cape Shield and Burns Shoal. The chart datums have been updated and later surveys approaching Milner Bay through Connexion Channel have been included.

Aus 15 Plans in the Northern Territory, Wessel Islands passages.

This chart contains four large scale plans of passages, straits, anchorages within the Wessel Islands chain, comprising surveys conducted by the RAN from 1987-93. Additionally the chart contains two plans of Gove Harbour, derived from surveys conducted by the Port Authority and RAN surveys to 1993.

<u>Limits:</u>	Cadell Strait	11° 52' 43"S	12° 07' 20"S
	1:75 000	135° 29' 05"E	135° 57' 11"E
	Gugari Rip or	11° 32' 01"S	11° 35' 25"S
	Hole in The Wall	136° 21' 04"E	136° 22' 58"E
	1:10 000		
	Cumberland Strait	11° 26' 26"S	11° 29' 49"S
	1:25 000	136° 27' 04"E	136° 30' 04"E
	Jensen Bay	11° 06' 50"S	11° 11' 55"S
	1:37 500	136° 38' 40"E	136° 43' 40"E
	Gove Harbour	12° 09' 25"S	12° 14' 30"S
	1:37 500	136° 38' 04"E	136° 42' 40"E
	Gove Inner Harbour	12° 11' 34"S	12° 12' 45"S
	1:12 500	136° 40' 24"E	136° 41' 30"E

Aus 337 King George Sound to Investigator Island (Western Australia), 1:300 000

Production of this chart now provides continuous coastal navigation between Cape Leeuwin and Esperance. Aus 337 completes the uncharted area (this scale) between King George Sound and chart Aus 762. The chart contains details from surveys conducted by the RAN between 1980 and 1992.

Aus 4727 Esperance to Whidbey Islands (WA/SA), 1:1 500 000**(Int 727)**

An International chart whose limits fall within the International Hydrographic Organisation's scheme, Area 'L', in the Indian Ocean. This chart is significant in providing continuous navigation for international and national shipping transiting the Great Australian Bight between Esperance (WA) and Spencer Gulf (SA). The chart replaces former British Admiralty chart 1059 published in 1881.

Aus 826 Bowen to Cape Bowling Green (Queensland), 1:150 000

This new chart based on modern vertical and horizontal datums, replaces the former Aus 826 of imperial units published in 1964. This particular chart incorporates the first extensive use of Laser Airborne Depth Sounder (LADS) technology (1993 survey), combined with the national bathymetric survey program conducted in 1986.

New Editions Published**Aus 163 Port of Burnie (Tasmania), 1:5 000**

A digital version of the former published chart of 1973. Modern vertical and horizontal datums have been applied and hydrographic surveys conducted by the Port Authority of 1988-89 have been included.

Aus 175 Bathurst Channel, Sheet 1 (Tasmania), 1:12 500

Shallow water blue tint was added to this modified reproduction of former black and white published Admiralty chart. Topographic detail on the accompanying Port Davey plan was adjusted for position and a recent hydrographic survey by the port authority was included.

Aus 158 Entrance to Port Phillip (Victoria), 1:37 500

This chart was updated to include port authority hydrographic surveys in the South Channel region and to amend navigation aids positions and characteristics.

Aus 164 Approached to Devonport (Tasmania), 1:37 500

A digital version of the former published chart of 1973. Modern vertical and horizontal datums have been applied and hydrographic surveys conducted by the port authority have been included (1990-93).

Aus 125 Plans in South Australia, Gulf of St. Vincent.

The general purpose of this new edition was the rescheming of a plan which included the ports of Stanvac and Noarlunga. The latter port area has been deleted from the new plan and the new limits extended northward to include the total extent of Port Stanvac port limits, as requested by the port authority.

Aus 812 Smokey Cape to Clarence River (NSW), 1:150 000

General update and the inclusion of ocean soundings east of the 100 fathom contour interval.

Aus 829 Brook Islands to Russell Island (Queensland), 1:150 000

New edition action required inclusion of information from the national bathymetric survey and adjustment to the graticule of the Mourilyan Harbour plan, found to be in error on the original published chart.

Aus 256 Cleveland Bay and Approaches (Queensland), 1:50 000

This urgent new edition includes the establishment of new navigational aids, their characteristics and renumbering in Platypus and Sea Channels. The chart shows details of the marina at Nelly Bay and includes hydrographic survey details (RAN 1993) between Cape Pallarenda and Rattlesnake Island.

Aus 209 Port Stephens (NSW), 1:25 000

This urgent new edition was produced to amend details of a number of navigation aids throughout the chart.

Aus 203 Port Jackson, Western Sheet (NSW), 1:10 000

This chart has been updated in digital format and the vertical datum for depths adjusted to Lowest Astronomical Tide (LAT). An additional continuation inset has been included providing coverage of the upper Parramatta River to the extent of ferry services west of the Gas Works Bridge.

Note: Readers are referred to the RAN Hydrographic Service Chart Catalogue and Bathymetric Map index for further details on available products.

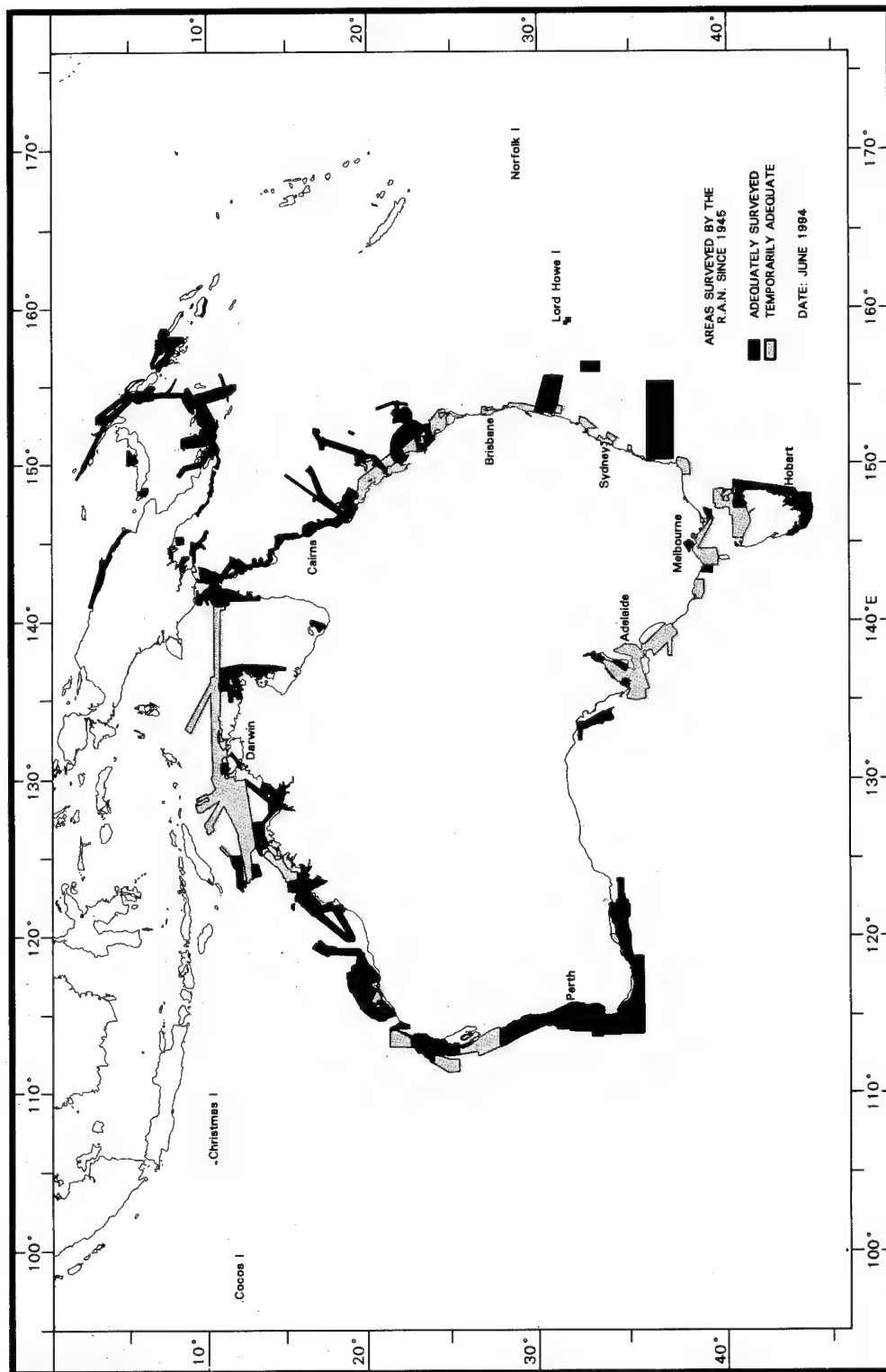


Figure 1. Survey Coverage

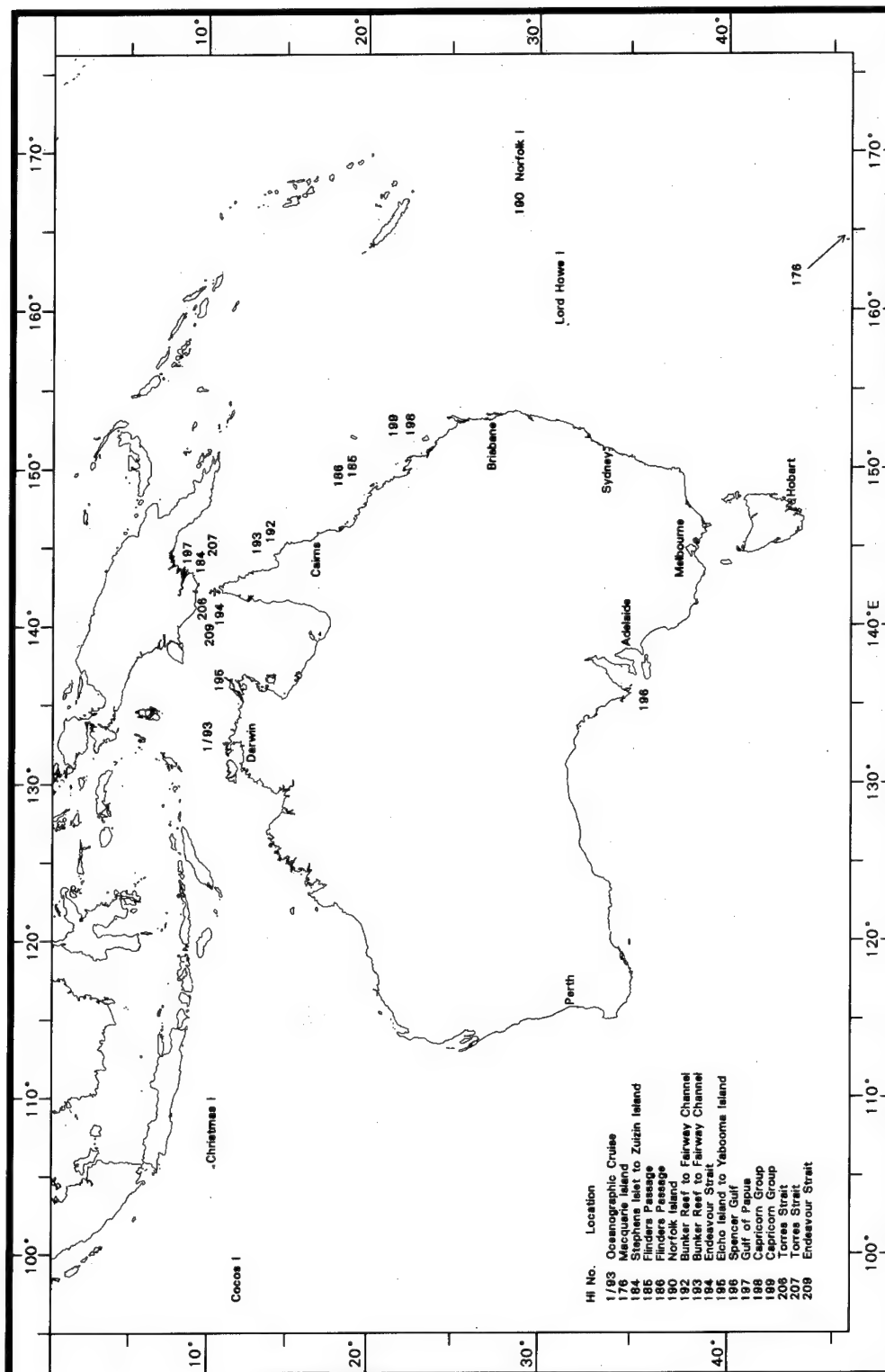


Figure 2. Surveys Undertaken 1993-1994

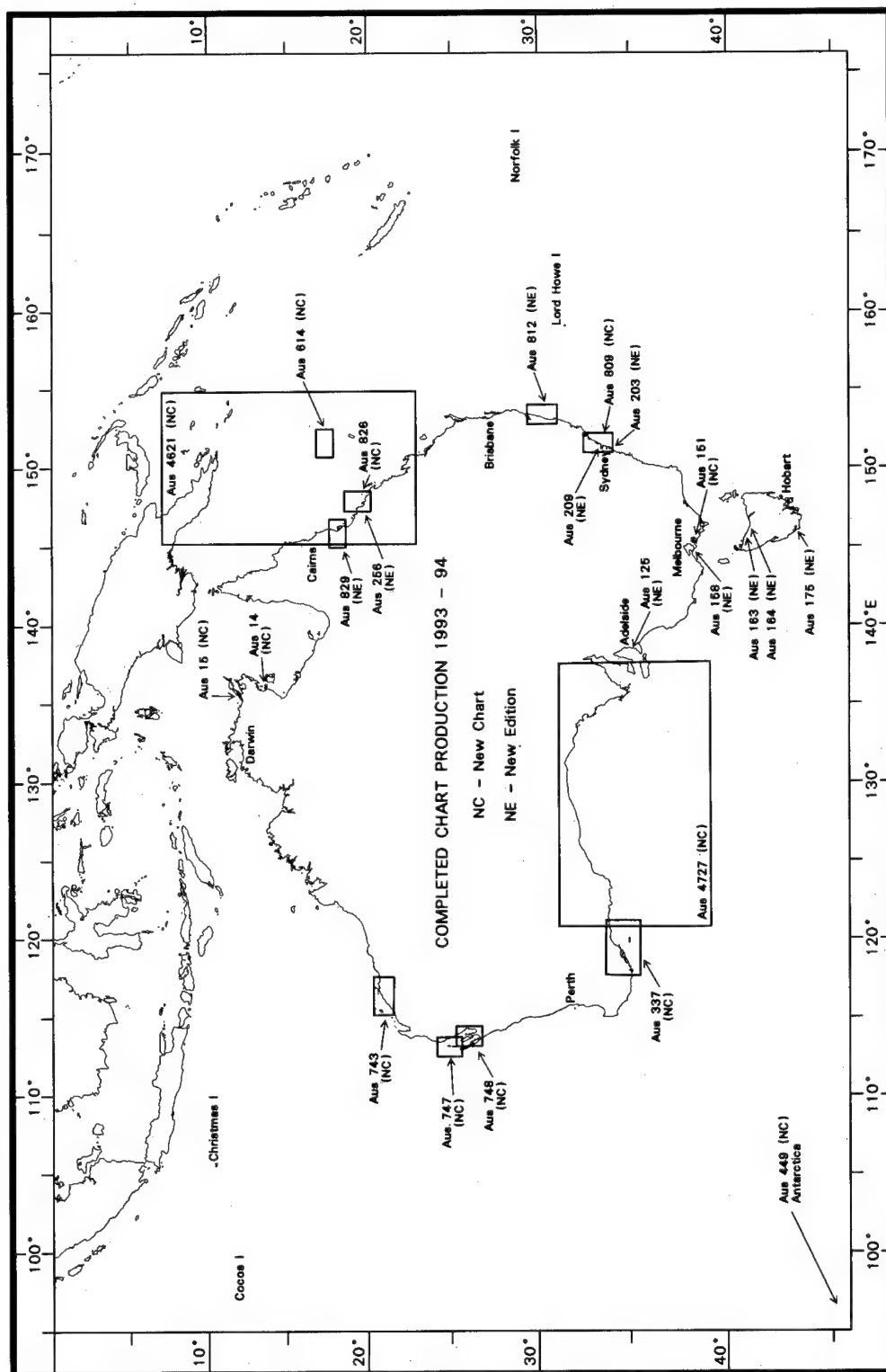


Figure 3. Charts Published 1993-1994

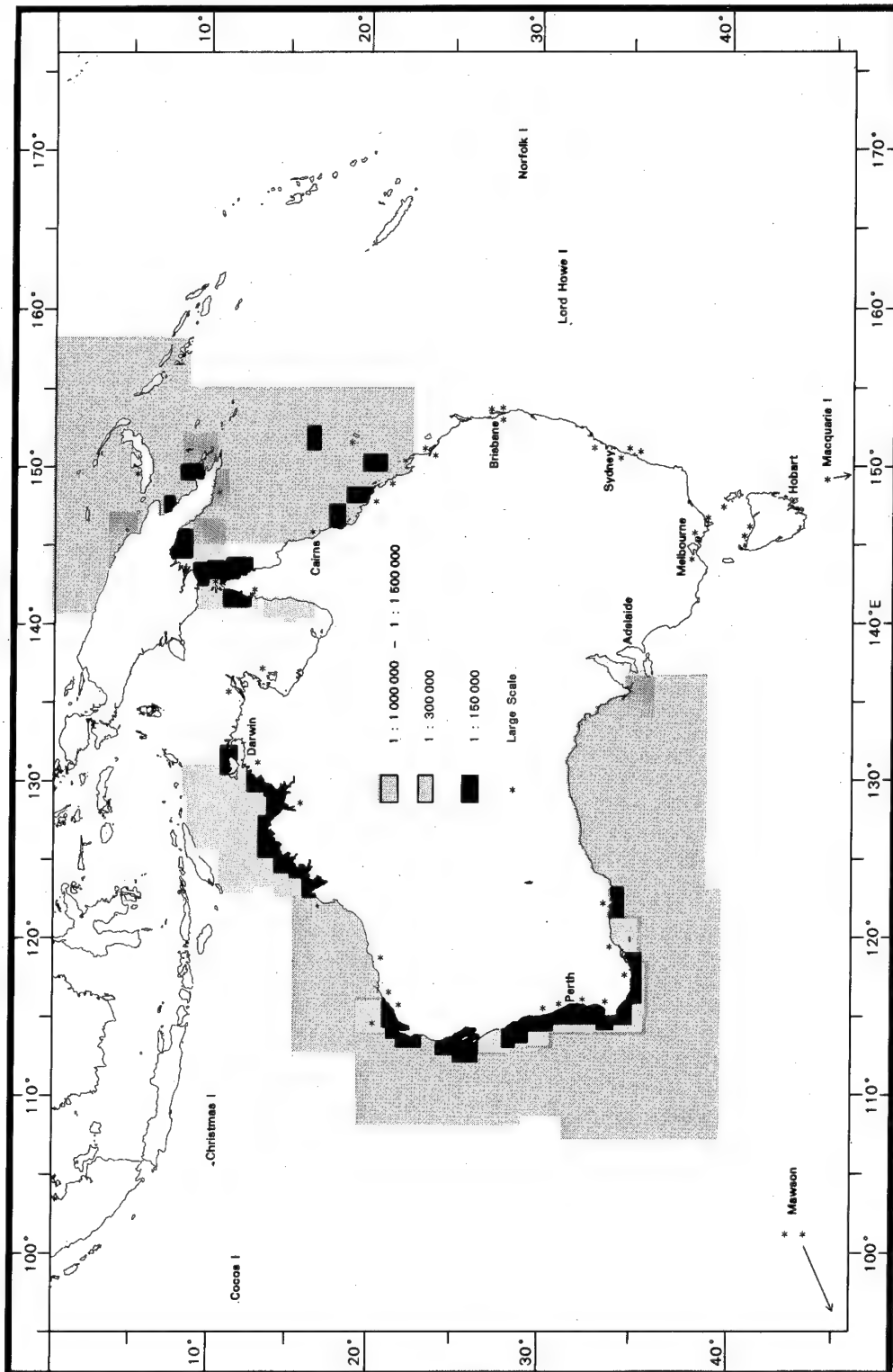


Figure 4. Digital Chart Coverage

Annex C. Chart Scheme Statistics At 30 June 94

Category/Scale	Published Imperial	Published Metric	Total Published	Planned Total
Small scale 1:150 000 to 1:1 000 000				
1:150 000 Aus, PNG	25	63	88	195
1:300 000 Aus, PNG	51	30	81	99
1:1 000 000 Aus, PNG, Antarctica	11	3	14	34
1:500 000 and smaller Aus, PNG, Antarctica	6	3	9	21
Large scale 1:5 000 to 1:100 000				
Aus	20	96	116	202
PNG	28	2	30	40
Antarctica	1	5	6	6
Territories & Reefs	3	4	7	16
International charts				
1:1 500 000	0	4	4	20
1:3 500 000	0	6	6	6
1:10 000 000	0	3	3	3
Other charts				
Recreational charts PC (Pleasure Craft) series	2	5	7	12
RAN Fleet series	9	14	23	40
Diagrams	17	5	22	30
Total:	173	243	416	724

Chart Datum Statistics

Horizontal Datum - Number of charts published

Pre AGD 66	107
AGD 66	202
WGS 84	42
INT series charts	13

Vertical Datum - Number of charts published

Port Datum	7
Indian Spring Low Water	210
LAT	107
Miscellaneous	30

Notices to Mariners key indicators for the 1993-94 period were:

	1991-92	1992-93	1993-94
Notices to Mariners issued	748	685	640
Block corrections for charts	25	22	23
Notes for charts	78	83	91
Reproduction of BA blocks	5	0	1
Reproduction of BA notes	7	24	11
Reproduction of NZ blocks	0	0	0
Reproduction of NZ notes	10	11	48
Hydrographic notes from HMA Ships	71	115	108
Hydrographic notes from other sources	33	35	30

Vessels (excluding HSF ships) rendering five or more Hydrographic Notes during the year were:

HMAS TARAKAN	10
HMAS DARWIN	9
HMAS WESTRALIA	8
HMAS PERTH	6
HMAS GEELONG	5
HMAS SWAN	5

Annex E.**Contributions & Acknowledgments**

Acknowledgment is made to the following organisations which supplied data to the Hydrographic office on an exchange or voluntary basis:

NEW SOUTH WALES	Maritime Services Board Public Works Department OPTUS	Lands Australia Telstra Australia Telecom Australia
NORTHERN TERRITORY	Darwin Port Authority Thiess Contractors Pty Ltd	AUSLIG GHD Surveys Pty Ltd
QUEENSLAND	DOT - Marine and Harbours Division AUSLIG McIntyre and Associates Pty Ltd Hamilton Island Enterprises	Sunmap Laguna Quays Resort Kinhill Riedel and Byrne
SOUTH AUSTRALIA	West Australia Petroleum Pty Ltd	Dept of Marine & Harbours
TASMANIA	TASMAP Port of Devonport Authority Marine Board of Hobart	ANARE Launceston Port Authority
VICTORIA	VICMAP Port of Geelong Authority	Port of Melbourne Authority
WESTERN AUSTRALIA	DOLA Western Australia Petroleum Pty Ltd CIES BHP Pty Ltd	Port Hedland Port Authority Telecom Australia FV Mary Jane Stella
ANTARCTICA	AUSLIG	
LORD HOWE ISLAND	Maritime Services Board	
NORFOLK ISLAND	Maritime Services Board Telecom Australia	Wilton Bell and Partners
PAPUA NEW GUINEA	ACRES/AUSLIG	Royal Papua Yacht Club

Hydrographer

Commodore J.W. Leech, RAN

Operations and Survey

Director Hydrographic Operations

Captain G. Geraghty, RAN

Head Operations and Surveying

Commander M. Hudson, RAN

Charting Services

Head Nautical Charting

Mr B.C. Leonard

Head Navigational Services

Mr M.A. Bolger

Manager Information Services

Mr I.P. Kennedy

Manager Chart Distribution

Mr N.J. Gillin

Co-ordination and Development

Director Co-ordination and Development

Mr K.G. Burrows, OAM

Head Branch Transition

Mr R.A. Furness

Manager Corporate Services

Mr A. Hodges

Manager Hydrographic Development

Commander P.A. Spencer, RAN

Head Computing Services

vacant

Manager National and International Affairs

Mr J. Randhawa

Manager Financial Resources

Mrs A. Lajoie

Manager Administrative Services

Mr J. O'Brien

Canberra

Hydrographic Projects Officer

Commander G.J. Bond, RANR



ADDRESSES

SYDNEY

RAN Hydrographic Office
161 Walker Street
NORTH SYDNEY NSW 2060

PO Box 1332
NORTH SYDNEY NSW 2059

Switch: (02) 925 4800
Fax: (02) 925 4225
Signal: HYDRO RAN

WOLLONGONG (From Nov 94)

8 Station Street
WOLLONGONG NSW 2500

Locked Bag 8801
South Coast Mail Centre NSW 2500

Switch: (042) 21 8500
Fax: (042) 21 8599

CANBERRA

Hydrographic Projects Officer
PO Box E33
Queen Victoria Terrace
CANBERRA ACT 2600
Phone: (06) 266 2587
Fax: (06) 266 2975

FIELD UNITS

HMAS MORESBY
PO Box 228
ROCKINGHAM WA 6168
Phone: (09) 527 0470

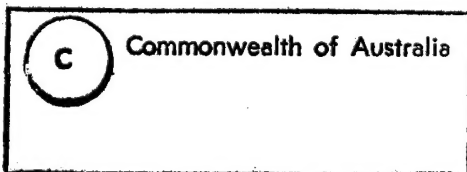
HMA Ships FLINDERS,
MERMAID, PALUMA,
SHEPPARTON, BENALLA
c/o HMAS CAIRNS
Draper Street
CAIRNS QLD 4870
Phone: (070) 50 3311

TRAINING SCHOOL

RAN Hydrographic School
HMAS PENGUIN
Middle Head Road
Mosman 2090
Phone: (02) 960 0264

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